

REMARKS

This Preliminary Amendment cancels, without prejudice, claims 1 to 9 in the underlying PCT Application No. PCT/EP2004/001731 and adds new claims 10 to 20. The new claims, inter alia, conform the claims to United States Patent and Trademark Office rules and does not add any new matter to the application.

In accordance with 37 C.F.R. § 1.125(b), the Substitute Specification (including the Abstract) contains no new matter. The amendments reflected in the Substitute Specification (including Abstract) are to conform the Specification and Abstract to United States Patent and Trademark Office rules or to correct informalities. As required by 37 C.F.R. §§ 1.121(b)(3)(ii) and 1.125(c), a Marked-Up Version of the Substitute Specification comparing the Specification of record and the Substitute Specification also accompanies this Preliminary Amendment. Approval and entry of the Substitute Specification (including Abstract) are respectfully requested.

The underlying PCT Application No. PCT/EP2004/001731 includes an International Search Report, dated July 2, 2004, a copy of which is included. The Search Report includes a list of documents that were considered by the Examiner in the underlying PCT application.

The underlying PCT Application No. PCT/EP2004/001731 also includes an International Preliminary Examination Report, dated February 22, 2005. An English translation of the International Preliminary Examination Report is included herewith.

It is respectfully submitted that the subject matter of the present application is new, non-obvious and useful. Prompt consideration and allowance of the application are respectfully requested.

Respectfully submitted,

KENYON & KENYON

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By: Cliff Ulrich

Clifford A. Ulrich
Reg. No. 42,194
One Broadway
New York, New York 10004
(212) 425-7200
CUSTOMER NO. 26646

SAFETY DEVICE FOR A MOTOR VEHICLE
COMPRISING A FRONT-END STRUCTURE

FIELD OF THE INVENTION

5 The present invention relates to a safety device for a motor vehicle ~~comprising~~, which may include a front-end structure, a front bulkhead, which separates the front-end structure from an interior, and a brake apparatus fixed to the front bulkhead and ~~comprising~~ which may include a brake cylinder.

10

BACKGROUND INFORMATION

~~From the prior art according to DE~~ In German Published Patent Application No. 198 39 521 [[C1]], a safety device for a motor vehicle ~~comprising~~ including a front-end structure and a front
15 bulkhead, which separates the front-end structure from an interior, is ~~known~~ described. Fixed to the ~~known~~ front bulkhead is a brake apparatus ~~comprising~~ including a brake cylinder. In the front end, furthermore, on the body shell structure, a mechanical forced guidance ~~means are~~ device is
20 provided, which interact with a supporting attachment disposed on a brake cylinder of the brake apparatus. In the event of a vehicle crash in which the front end is deformed, the mechanical forced guidance ~~means~~ device is displaced in the direction of the brake apparatus. If the deformation is great
25 enough, the mechanical forced guidance ~~means~~ device acts upon the supporting flange on the brake cylinder and brings about a purposeful pivot motion of the brake apparatus. The brake apparatus is connected to brake pedals protruding into the interior. Through the pivoting of the brake apparatus, the
30 brake pedals are swung out of the foot well.

It is additionally ~~known from the prior art~~ conventional to provide structural elements and assemblies disposed in the front-end structure, such as, for example, an engine, with

special forced guidance ~~means~~ device assigned to the brake apparatus. To this end, reference is made, for example, to [[JP 10-338 167 a]] Japanese Published Patent Application No. 10-338167. From this ~~prior-art~~, it is also ~~known~~ conventional to provide the brake cylinder of a brake apparatus with ~~means~~ a device for pivoting the brake apparatus, which ~~means~~, in the event of a vehicle crash, ~~interact~~ interacts with structural elements disposed in the front-end structure.

SUMMARY

~~The object~~ An example embodiment of the present invention ~~is~~ ~~to~~ may provide a safety device for a motor vehicle ~~comprising~~ including a front-end structure, a front bulkhead, and a brake apparatus fixed to the front bulkhead, by ~~means of~~ which the injury risk for a driver of the motor vehicle in the foot region ~~[[is]]~~ may be reduced by a simple ~~means~~ arrangement in the event of a vehicle crash.

~~This object is achieved by a safety device for a motor vehicle having the features of patent claim 1.~~

Accordingly, An example embodiment of the present invention ~~is distinguished by~~ may include a brake apparatus fixed to the front bulkhead and having a brake cylinder, the brake cylinder having ~~means~~ a device for pivoting the brake apparatus which ~~have~~ includes a fastening portion and a slide portion with a slide plane. By ~~means of~~ the fastening portion, the slide portion ~~can~~ may be easily connected to the brake cylinder. In the event of a vehicle crash in which the front-end structure is deformed, the slide plane interacts with structural elements disposed in the front-end structure. Through suitable alignment of the slide plane, the interaction of these structural elements disposed in the front end brings about a tilting motion of the brake apparatus. This tilting motion causes the pedals connected to the brake apparatus and

protruding into the interior to swing out. An injury risk for the driver of the vehicle in the foot region ~~[[is]]~~ may thereby be reduced.

5 ~~It is conceivable that the means~~ The device for pivoting the brake apparatus are assigned to the, in the direction of travel, forward-pointing end face of the brake cylinder. As a result, the slide portion protrudes relatively far into the front-end structure, whereby the brake apparatus plays an
10 early part in deforming the front-end structure through the previously described tilting motion. As a result of this early involvement in the front-end deformation, the brake apparatus ~~can~~ may cover relatively large swivel angles, allowing the brake pedal to be reliably swung out from the
15 foot well.

The ~~means~~ device for pivoting the brake apparatus ~~can~~ may be detachably connected to the main brake cylinder. This ~~yields~~ the ~~advantage~~ may provide that different peaks ~~can~~ may be
20 provided according to vehicle model or depending on whether the model in question is a right-hand or left-hand drive. In addition, it ~~allows~~ may allow already installed brake apparatuses to be easily upgraded. Added to this is ~~the fact~~ that, in the case of a multipart construction, there ~~[[is]]~~
25 may be a free choice of material, so that the material for the ~~means~~ device for pivoting the brake apparatus ~~can~~ may be chosen independently from the material for the brake cylinder. Of ~~course,~~ it It is also ~~conceivable~~ possible to realize the ~~means~~ device for pivoting the brake apparatus in one part with
30 the brake cylinder, which, in turn, ~~yields~~ may yield benefits in terms of manufacturing costs, since, in place of two separate structural elements, a single structural element needs may need to be made.

The slide plane ~~can~~ may be aligned such that the brake apparatus, in the event of a vehicle crash, performs a swivel motion about a substantially horizontal axis. This swivel motion ~~ensures~~ may ensure that the brake pedal ~~can~~ may be
5 reliably swung out from the foot well of the interior of the motor vehicle.

The slide portion ~~can consist of~~ may include four faces arranged in a certain manner one relative to the other, one
10 face of which forms the slide plane. These faces ~~can here~~ may enclose a cavity. This arrangement ~~yields the advantage~~ may provide the feature, in comparison to solid structural elements, of lower weight. Through the use of a plurality of faces, the stability of the structural element ~~[[is]]~~ may be
15 considerably increased. The four faces ~~can~~ may be arranged, for example, such that, in a longitudinal section in the vertical direction of the vehicle, they have a triangular ~~cross-section~~ cross-section, one corner of which is aligned downward.

20 It is ~~conceivable~~ possible that at least one of the faces of the slide portion has a downwardly increasing wall thickness. This ~~embodiment can~~ may be conditioned by production engineering factors if the slide portion, for example, is
25 realized as a casting. It also, however, ~~yields~~ may provide additional advantages with respect to the stability, particularly e.g., of the slide plane.

In the cavity, ~~means can~~ a device may be provided for the
30 drainage of liquids, such as, for example, a discharge opening. This ~~yields~~ may provide the advantage that, for example, cleaning agents used in an engine wash, which might have collected in the cavity, ~~can~~ may easily run away.

The fastening portion of the means device for pivoting the brake apparatus can may have receiving fixtures for fastening means devices, such as bores, for example. By way of these bores, a connection between the means device for pivoting the
5 brake apparatus and the brake cylinder is able to be established in, e.g., a particularly cheap and simple manner by means of fastening means devices.

According to an example embodiment of the present invention, a
10 safety device for a motor vehicle includes: a front-end structure; a front bulkhead separating the front-end structure from an interior; and a brake apparatus fixed to the front bulkhead and including a brake cylinder, the brake cylinder including a pivot device adapted to pivot the brake apparatus
15 and to interact, in an event of a vehicle crash, with structural elements arranged in the front-end structure, the pivot device including a fastening portion and a slide portion having a slide plane.

20 The pivot device may be arranged at, in a direction of travel, a forward-pointing end face of the brake cylinder.

The pivot device may be detachably connected to the brake cylinder.

25 The slide plane may be aligned so that the brake apparatus, in the event of the vehicle crash, performs a swivel motion about a substantially horizontal plane.

30 The slide portion may include four faces forming a cavity, one face of the four faces forming the slide plane.

The cavity, in a longitudinal section in a vertical direction of the motor vehicle, may have a triangular cross-section, one
35 corner of the triangular cross-section aligned downwardly.

At least one of the four faces of the slide portion may include a downwardly increasing wall thickness.

5 The cavity may include a discharge opening.

The fastening portion may include reception fixtures for fastening devices.

10 According to an example embodiment of the present invention, a safety device for a motor vehicle includes: a front-end structure; a front bulkhead separating the front-end structure from an interior; and a brake apparatus fixed to the front bulkhead and including a brake cylinder, the brake cylinder
15 including means for pivoting the brake apparatus and for interacting, in an event of a vehicle crash, with structural elements arranged in the front-end structure, the means including a fastening portion and a slide portion having a slide plane.

20 According to an example embodiment of the present invention, a motor vehicle includes: a safety device, including: a front-end structure; a front bulkhead separating the front-end structure from an interior; and a brake apparatus fixed to the
25 front bulkhead and including a brake cylinder, the brake cylinder including a pivot device adapted to pivot the brake apparatus and to interact, in an event of a vehicle crash, with structural elements arranged in the front-end structure, the pivot device including a fastening portion and a slide
30 portion having a slide plane.

The Example embodiments of the present invention will be ~~are~~
explained in greater detail below with reference to the
~~illustrative embodiment represented in the drawings, in which~~
35 appended Figures.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 ~~shows is~~ a diagrammatic schematic side view of the
inventive an example embodiment of a safety device for a motor
5 vehicle ~~comprising~~ including a front-end structure[[,]].

Fig. 2 ~~shows is~~ a ~~three-dimensional representation~~ perspective
view of the ~~means according to the invention~~ a device for
pivoting a brake apparatus[[,]].

10

Fig. 3 ~~shows is~~ a side view of the ~~means according to~~ device
illustrated in Figure 2 from the side facing toward a brake
cylinder[[,]].

15 Fig. 4 ~~shows is~~ a side view of the ~~means according to~~ device
illustrated in Figure 2 from the side facing away from the
brake cylinder[[,]].

Fig. 5 ~~shows is~~ a top view of the ~~means according to~~ device
20 illustrated in Figure 2.

DETAILED DESCRIPTION

A passenger vehicle has, e.g., in a conventional manner ~~which~~
~~is fundamentally known~~, a front-end structure 1 ~~(not fully~~
25 ~~represented in Figure 1)~~ which has as body shell parts, inter
alia, two front-end longitudinal members 2 and, for each
vehicle side, respectively a spring strut bracket 3 or a wheel
housing. The front-end longitudinal members 2 merge into a
front bulkhead 4, which forms the termination of the front-end
30 structure 1 in the direction of the passenger compartment and
the vehicle interior. Protruding into a foot well 5 of the
vehicle interior, e.g., in a conventional manner ~~which is~~
~~fundamentally known~~, is a brake pedal 7, which is coupled to a
brake apparatus 6. The brake apparatus 6 is fixed to the
35 front bulkhead 4.

The front-end structure 1 bounds a front-end space, which in vehicles with a front engine constitutes an engine compartment and in vehicles with rear engine or in vehicles with a centrally placed engine constitutes a trunk or loading space.

The brake apparatus 6 is fixed to the front bulkhead 4 ~~[[in]]~~ such a way that a brake booster 8 is located on that side of the front bulkhead 4 which faces toward the front-end space, i.e., the engine compartment or the trunk or loading space. To the front in the longitudinal direction of the vehicle, the brake booster 8 is adjoined by a main brake cylinder 9, which is likewise part of the brake apparatus 6. Above the main brake cylinder 9, a pressure medium reservoir 10 can be placed in a conventional manner ~~which is known per se~~.

In a front end face region of the brake apparatus 6, in the ~~represented illustrative~~ illustrated example embodiment in a front end face region of the brake cylinder 9, a means device 11 for pivoting the brake apparatus 6 is provided on a housing of the brake cylinder 9. This means device 11 is described in greater detail below with reference to Figures 2 to 5.

In Figure 2, a means device 11 for pivoting the brake apparatus 6 is ~~represented~~ illustrated in perspective view. The means device 11 has a fastening portion 12 and a slide portion 13. The fastening portion 12 ~~consists of~~ includes two faces 14 and 15, aligned substantially at right angles to each other. In the face 15 there are made two bores 16 for the reception of fastening means devices.

The slide portion 13 ~~consists of~~ includes four faces 14, 17, 18 and 19. The face 19 is arranged in extension of the face 15 of the fastening portion and forms a slide plane. The face 14 corresponds to the face 14 to be assigned to the fastening

portion 12. The face 18 is arranged parallel to the face 14. Extending between these two faces is the face 17. The faces 14, 17, 18 and 19 enclose a cavity 20. This cavity 20 has a triangular ~~cross-section~~ cross-section, one corner of which
5 borders on the fastening portion 12, in particular on the face 15 thereof. In the installed state, the ~~means~~ device 11 for pivoting the brake apparatus is arranged such that the slide plane 19 points forward in the direction of travel, the face 17 is assigned to the brake cylinder 9. The ~~means~~ device 11
10 ~~are~~ is connected by the fastening portion 12 to the brake cylinder 9. The cavity 20 is thus open to the top.

In Figure 3, the ~~means~~ device 11 is ~~represented~~ illustrated in a side view of the face 17 assigned to the brake cylinder. In
15 addition, the two mutually parallel faces 14 and 18, and the face 19 projecting over the face 17, are discernible. The lower termination of the ~~means~~ device 11 is formed by the face 15.

20 In Figure 4, the ~~means~~ device 11 is ~~represented~~ illustrated in a side view of the slide plane 19. In addition to the face 19, the face 15 is discernible, which forms the lower termination of the ~~means~~ device 11 and projects laterally over the face 19. In addition, an end opening 21 is discernible.
25 This end opening 21 is realized as a bore which passes through the face 19. The end opening 21 ~~ensures~~ may ensure that liquids received in the cavity 20 are able to run away.

Figure 5 ~~shows~~ is a top view of the ~~means~~ device 11. Located
30 in the plane of the drawing is the face 15 with the two bores 16. Extending perpendicular to the plane of the drawing are the faces 14, 18 and 17. Extending obliquely to the plane of the drawing, ~~which is not apparent, however, in this representation,~~ is the slide plane 19. In the slide plane 19,
35 the discharge opening 21 is also identifiable.

It is apparent from Figure 5 that the wall thicknesses of the faces 14, 17 and 18 increase in the downward direction. Their thickness ~~can~~ may measure, for example, 4 mm in the upper
5 region and 7 mm in the lower region. The slide plane 19 ~~can~~ may be realized correspondingly. With a 7 mm thick face 15 containing the bores 16, it is possible to produce a sufficiently rigid structural element. The ~~means~~ device 11 ~~can~~ may be realized, for example, as a casting. ~~In this case,~~
10 ~~the~~ The distribution of the structural element thickness ~~[[is]]~~ may be conditioned by production engineering factors.

The ~~modus operandi~~ operation of the safety device ~~according to the invention for a motor vehicle having a front end structure~~
15 is described below. In the event of a vehicle crash, the front-end structure 1 is deformed ~~[[in]]~~ such a way that the front-end longitudinal member 2 and the spring strut bracket move in the direction of the front bulkhead. Structural elements disposed in the front-end structure are thereby moved
20 ~~likewise~~ in the direction of the front bulkhead. When the deformation is sufficiently large, the moment is sometime reached at which the brake apparatus 6 collides, with the forward-pointing slide plane 19, with structural elements disposed in the front-end structure. Due to the alignment of
25 the slide plane 19, the brake apparatus 6 is rotated about a substantially horizontal swivel axis. The brake apparatus 6 thus undergoes a tilting motion. The tilting motion, as ~~shown~~ illustrated in the ~~representation according to~~ Figure 1, is realized in the clockwise direction. Through this tilting
30 motion of the brake apparatus 6, the brake pedal 7 coupled to the brake apparatus 6 is moved out of the foot well 5 forward in the direction of travel, so that injury risks for the foot region of the driver are may be reduced.

In order to prevent the possibility that further buckling of the front-end structure in the longitudinal direction of the vehicle in connection with the front-end deformation during the vehicle crash might lead to rearward displacement of the brake apparatus 6, inclusive of the brake pedal 7, toward the foot well 5, the slide plane 19 ~~can~~ may be ~~designed~~ arranged such that, from a certain swivel angle of the brake apparatus 6 relative to the front bulkhead 4, it slides off from the structural element disposed in the front-end structure and with which it interacts, with the result that no further torque is applied to the brake apparatus 6. This ~~ensures~~ may ensure that the desired swiveled-back position of the brake pedal 7 is maintained and that the brake apparatus 6 no longer leads to any further rearward displacement of the brake apparatus 6 resulting from a further deformation of the front-end region.

~~Of course, it~~ It is also ~~conceivable~~ possible to realize the means device 11 for pivoting the brake apparatus 6 in one piece with the brake cylinder. ~~Similarly, fastening means~~ Fastening devices present in the brake cylinder, such as, for example, a closing screw, ~~can~~ may be ~~designed~~ arranged such that they have a slide portion 13 having a slide plane 19.

~~Abstract~~

ABSTRACT

A safety device ~~is described~~ for a motor vehicle ~~comprising~~
including a front-end structure ~~(1)~~, a front bulkhead ~~(4)~~,
5 which separates the front-end structure ~~(1)~~ from an interior
~~(5)~~, and a brake apparatus ~~(6)~~ fixed to the front bulkhead ~~(4)~~
and ~~comprising~~ **including** a brake cylinder ~~(9)~~, the brake
cylinder ~~(9)~~ ~~having means (11)~~ **includes a device** for pivoting
the brake apparatus ~~(6)~~, which means **device**, in the event of a
10 vehicle crash, ~~interact~~ **interacts** with structural elements
disposed in the front-end structure ~~(1)~~. ~~As a result of the~~
~~invention, the~~ **The** safety of a driver present in the motor
vehicle ~~is intended to~~ **may** be increased. ~~To this end, it is~~
~~proposed that the means (11)~~ **The device** for pivoting the brake
15 apparatus ~~consist of~~ **includes** a fastening portion and a slide
portion with a slide plane.

~~(Fig. 1)~~